



<http://dx.doi.org/10.11646/zootaxa.3826.3.8>

<http://zoobank.org/urn:lsid:zoobank.org:pub:DCEAAE0A-3500-41E2-B3B7-63C4F8D88D69>

## A new species of *Neoliomera* Odhner, 1925, from the western Pacific, and the first record of *N. demani* Forest & Guinot, 1961, from Taiwan (Crustacea: Decapoda: Brachyura: Xanthidae)

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### Abstract

A new species of a strikingly coloured xanthid crab of the genus *Neoliomera* Odhner, 1925, is described from coral reefs in Guam, Taiwan, and the Hawaiian Islands. The new species is allied to *N. pubescens* (H. Milne Edwards, 1834), and *N. demani* Forest & Guinot, 1961, but differs in the form of the carapace armature, frontal margin, structure of the chela, proportions of the ambulatory merus and the form of the male first gonopod. *Neoliomera demani* is also recorded from Taiwan for the first time and aspects of its taxonomy are discussed.

**Key words:** Crustacea, Brachyura, Xanthidae, *Neoliomera*, taxonomy, new species, *Neoliomera demani*, new record, Taiwan, Guam, Hawaiian Islands

### Introduction

The Indo-West Pacific xanthid genus *Neoliomera* Odhner, 1925, currently contains 17 species: *N. cerasinus* Ng, 2002, *N. demani* Forest & Guinot, 1961, *N. insularis* (Adams & White, 1849), *N. intermedia* Odhner, 1925, *N. lippa* (Nobili, 1905), *N. moana* Poupin & Starmer, 2013, *N. nobilii* Odhner, 1925, *N. ovata* Tweedie, 1950, *N. praetexta* (Rathbun, 1906), *N. pubescens* (H. Milne Edwards, 1834) (type species), *N. richtersi* (De Man, 1889), *N. richteroides* Sakai, 1969, *N. sabaia* (Nobili, 1905), *N. striata* Buitendijk, 1941, *N. sunndaica* (De Man, 1888), *N. themisto* (De Man, 1889), and *N. variolosa* (A. Milne-Edwards, 1873) (Ng 2002; Ng *et al.* 2008; Fujita *et al.* 2013). A recent molecular study showed that *Neoliomera* was a separate lineage in the Xanthidae that is supported by a number of male sterno-abdominal and ambulatory-leg characters (Lai *et al.* 2012: 435).

The authors recently obtained specimens of two species allied to *N. pubescens* from Taiwan and Guam. One proved to be *N. demani*, and represents a new record for Taiwan. The other species is allied to *N. pubescens* but can be distinguished by a number of carapace and gonopod differences, and is here regarded as new. The taxonomy of these two taxa is herein revised.

The abbreviations G1 and G2 are used for the male first and second gonopods, respectively. Measurements provided, in millimeters, are of the carapace width and length, respectively. Specimens are deposited in the National Taiwan Ocean University (NTOU), Keelung, Taiwan; Zoological Reference Collection (ZRC), Lee Kong Chian Natural History Museum (= Raffles Museum of Biodiversity Research), National University of Singapore; and Muséum national d'Histoire naturelle (MNHN), Paris.

## Taxonomy

### Family Xanthidae MacLeay, 1838 (sensu Guinot 1978)

### Subfamily Liomerinae Sakai, 1976 (sensu Serène 1984)

### *Neoliomera* Odhner, 1925

**Type species.** *Zozymus pubescens* H. Milne Edwards, 1834, by original designation; gender feminine.

### *Neoliomera fragraea* n. sp.

(Figs. 1A–E, 2, 3A, B, 4A, B, E, 5, 7B, E)

*Neoliomera pubescens*—Rathbun 1906: 844 (Molokai, Hawaiian Islands); Edmondson 1946: 292, fig. 178b (Hawaiian Islands); Edmondson 1962: 252, fig. 9d (Hawaiian Islands); Sakai 1976: 399, part (O‘ahu, Hawaiian Islands); Castro 2011: 99 (list). (not *Zozymus pubescens* H. Milne Edwards, 1834)

**Material examined.** Holotype male (18.3 × 10.1 mm, with bopyrid) (ZRC 2014.0206), Urunao reef front, Guam, <2 m water, coll. G. Paulay, 1 June 2000. Paratypes: 1 male (16.4 × 9.6 mm) (ZRC 2014.0207), 1 female (16.8 × 9.6 mm) (NTOU 2014.031401), 1 male (18.2 × 10.8 mm, with bopyrid) (NTOU 2014.031402), same data as holotype.—1 male (12.3 × 6.8 mm) (ZRC 2014.0184), Agat Bay, north of Alutom Islands, Mariana Islands, Guam, 3–6 m, among rocks, coll. F. Schroeder, 25 October 2000.—3 males (9.6 × 5.5–16.5 × 9.5 mm) (ZRC 2014.0182), Agat Bay, north of Alutom Islands, Mariana Islands, Guam, 3–6 m, among silty rocks, coll. H. Conley, 9 November 2000.—1 male (10.4 × 6.1 mm), 1 female (11.9 × 7.5 mm) (ZRC 2014.0183), Agat Bay, north of Alutom Islands, Mariana Islands, Guam, 3–6 m, among rocks and silt, coll. H. Conley, November 2000.—1 male (11.6 × 7.1 mm) (ZRC 2014.0185), Agat Bay, north of Alutom Islands, Mariana Islands, Guam, 3–6 m, among rocks, coll. H. Conley, 15 November 2000. Other records: 1 female (25.3 × 14.3 mm) (NTOU 2009.062401), 1 female (17.7 × 10.2 mm) (ZRC 2014.0186), Chia-Le-Sui, Pintung County, Taiwan, intertidal, among rocks, coll. Y.-J. Shih, 24 June 2009.—1 female (23.9 × 15.0 mm) (ZRC 2000.0483), ca. 1 m, in coral head, Chinaman’s Hat, O‘ahu, Hawai‘i, coll. D. Takaoka, 29 April 1997.

**Diagnosis.** Carapace grooves separating gastric, branchial regions shallow, with scattered short setae that never obscure margins or surfaces; dorsal surface covered with numerous evenly spaced, small rounded granules; pterygostomial, suborbital, sub-branchial regions covered with numerous small rounded granules (Figs. 2, 3A); front bilobed, subtruncate lobes separated by V-shaped cleft (Figs. 2, 3A); anterolateral margin strongly convex; posterior one-third with 2 low but distinct granular lobes separated by shallow broad cleft; anterior two-thirds granular, uneven, appearing entire (Figs. 2A, B, 3A); chelipeds with outer surfaces covered with numerous small granules, fingers shorter than palm; dactylus, pollex completely pigmented, pigmentation on pollex extending slightly into palm (Figs. 2A, 4A, B); ambulatory legs relatively short, margins of all articles with scattered long and short simple setae that do not obscure margins; margins, submarginal outer surfaces not cristate, surfaces covered with distinct granules, merus very short (Figs. 2A, 3A, B, 4E); thoracic sternum broad, entire surface covered with numerous small rounded granules (Fig. 3B); G1 with prominent subovate subdistal lobe, long, extending beyond almost straight tip (Fig. 7B, E).

**Description.** Carapace regions not well defined; grooves separating gastric, branchial regions shallow, just discernible, with scattered short setae which never obscure margins or surfaces; shallow Y-shaped groove separating low epigastric regions; dorsal surface covered with numerous evenly spaced small rounded granules, those on median parts lower, relatively smaller; pterygostomial, suborbital, sub-branchial regions covered numerous small rounded granules (Figs. 2, 3A, 5A). Front produced just beyond orbits; bilobed, subtruncate lobes separated by distinct V-shaped cleft; margin convex, gently deflexed downwards (Figs. 2, 3A, 5A). Orbits subovate; cornea relatively large, pigmented; ocular peduncle short, stout, covered with small granules (Fig. 2C). Supraorbital margin granular; external orbital angle marked by low granular lobe or group of granules (Figs. 2, 3A). Infraorbital margin uneven, granular, otherwise unarmed (Fig. 2C). Anterolateral margin strongly convex; posterior one-third with 2 low but distinct granular lobes, separated by shallow broad cleft; anterior two-thirds

uneven, appears entire, lined with granules of various sizes (Figs. 2A, B, 3A, 5A). Posterolateral margin almost straight or gently convex, converging sharply to posterior carapace margin (Figs. 2A, B, 3A, 5A). Posterior margin of carapace gently convex, lined with closely-set small submarginal granules (Figs. 2A, B, 3A, 5A). Antennules short, folding transversely (Fig. 2C). Antennal flagellum short, passes through orbital hiatus, not just reaching outer edge of orbit; basal segment subrectangular, relatively large (Fig. 2C). Surface of epistome medially depressed; posterior margin gently sinuous from frontal view, median part slightly dilated, with small median cleft (Fig. 2C). Endostome without discernible ridges. Outer surface of third maxilliped gently granular to smooth. Ischium subrectangular, with distinct median oblique sulcus. Merus quadrate, anteroexternal margin angular but rounded, slightly produced, median part gently depressed. Exopod relatively stout proximally, distal part not to anterior edge of merus; flagellum long.

Chelipeds symmetrical (Figs. 2A, 3A, 5A). Outer surfaces of merus, carpus, chelae covered with numerous rounded granules of varying sizes, granules on dorsal margins generally larger, sharper (Figs. 2A, 3A, 4A, B). Carpus subovate, inner distal angle with low sharp tooth (Figs. 2A, 3A, 4A, B). Merus without distinct spines or teeth. Fingers shorter than palm, outer surface of each finger with 2 longitudinal grooves, cutting margins with several well developed teeth with convex margins; distal part curved, tip with inner surface excavated, subspatuliform, inner surface with scattered simple setae (Fig. 4A, B). Dactylus completely black to dark brown, tip lighter coloured (Fig. 4A, B). Pollex black to dark brown except for lighter coloured tip, pigmentation reaching slightly into inner, outer surfaces (Fig. 4A, B).

Ambulatory legs relatively short; second pair longest (Figs. 1, 2A, 3A, 5A). Margins of all articles with scattered long and short simple setae that do not obscure margins (Figs. 2A, 3A, B, 4E, 5A). Merus conspicuously short; margins, submarginal outer surfaces not cristate, surfaces covered with distinct granules; granules on dorsal margin relatively larger, uneven in shape (Figs. 3B, 4E). Outer surfaces, margins of carpus, propodus covered with numerous small, rounded granules (Figs. 2A, 3A, 4E, 5A). Dactylus relatively short, stout, distinctly shorter than propodus, gently curved with corneous distal tip (Figs. 2A, 4E). Dactylo-propodal lock distinct (Fig. 4E).

Thoracic sternum broad, entire surface covered with numerous small rounded granules; sternites 1–3 completely fused; sternites 3, 4 fused, medial suture not clearly discernible with only lateral part distinct (Fig. 3B). Gonopore coxal. Abdomen with somites 3–5 completely fused, sutures separating segments not discernible, lateral margins gently concave; somites 1–3 trapezoidal, somite 6 about as broad as long, lateral margins gently concave; telson triangular, lateral margins gently concave, tip rounded (Fig. 3B).

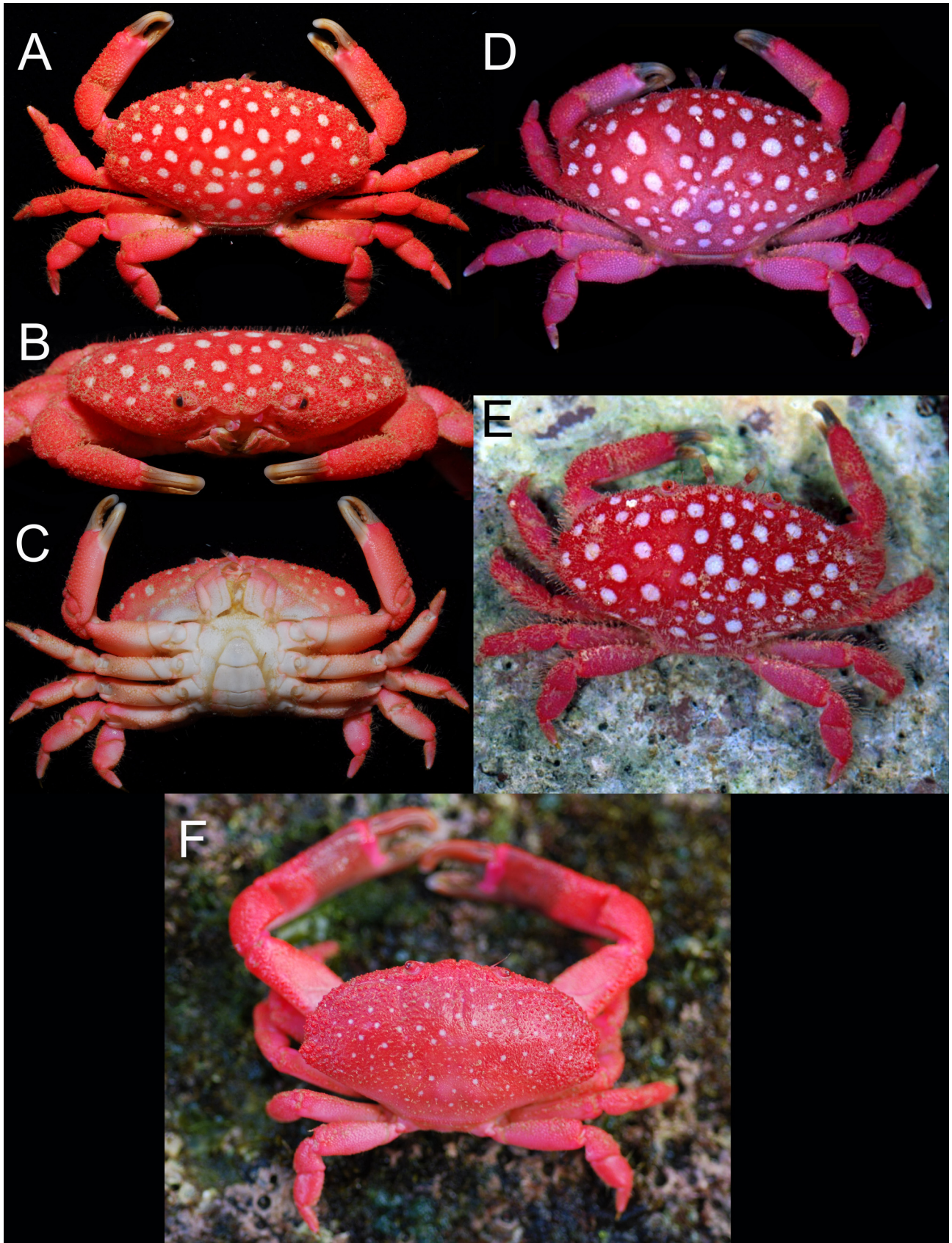
G1 long, relatively stout, gently sinuous; with prominent subovate subdistal lobe, long, extending beyond almost straight tip; dorsal margin with numerous long plumose setae (Fig. 7B, E). G2 short, with short distal segment.

**Variation.** There is no obvious dimorphism between the sexes. The structures of the carapaces as well as proportions of the ambulatory legs are the same in both sexes. The structure of the anterolateral margin varies slightly, with the lobes sometimes lower in smaller specimens but is, however, always distinct. The female abdomen is ovate, covering about half of the thoracic sternum, with all the somites and telson free. The vulvae are large, swollen and are on the anterior half of thoracic sternite 6. There is no obvious opercular cover (Fig. 5B).

**Etymology.** The species is named after the genus name for strawberries (*Fragraea*), alluding to its live colouration. The name is used as a noun in apposition.

**Colour in life.** The species is an overall bright red to crimson overall with regularly arranged white spots on the dorsal surface of the carapace (Fig. 1A–E). The fingers are black to greyish-brown.

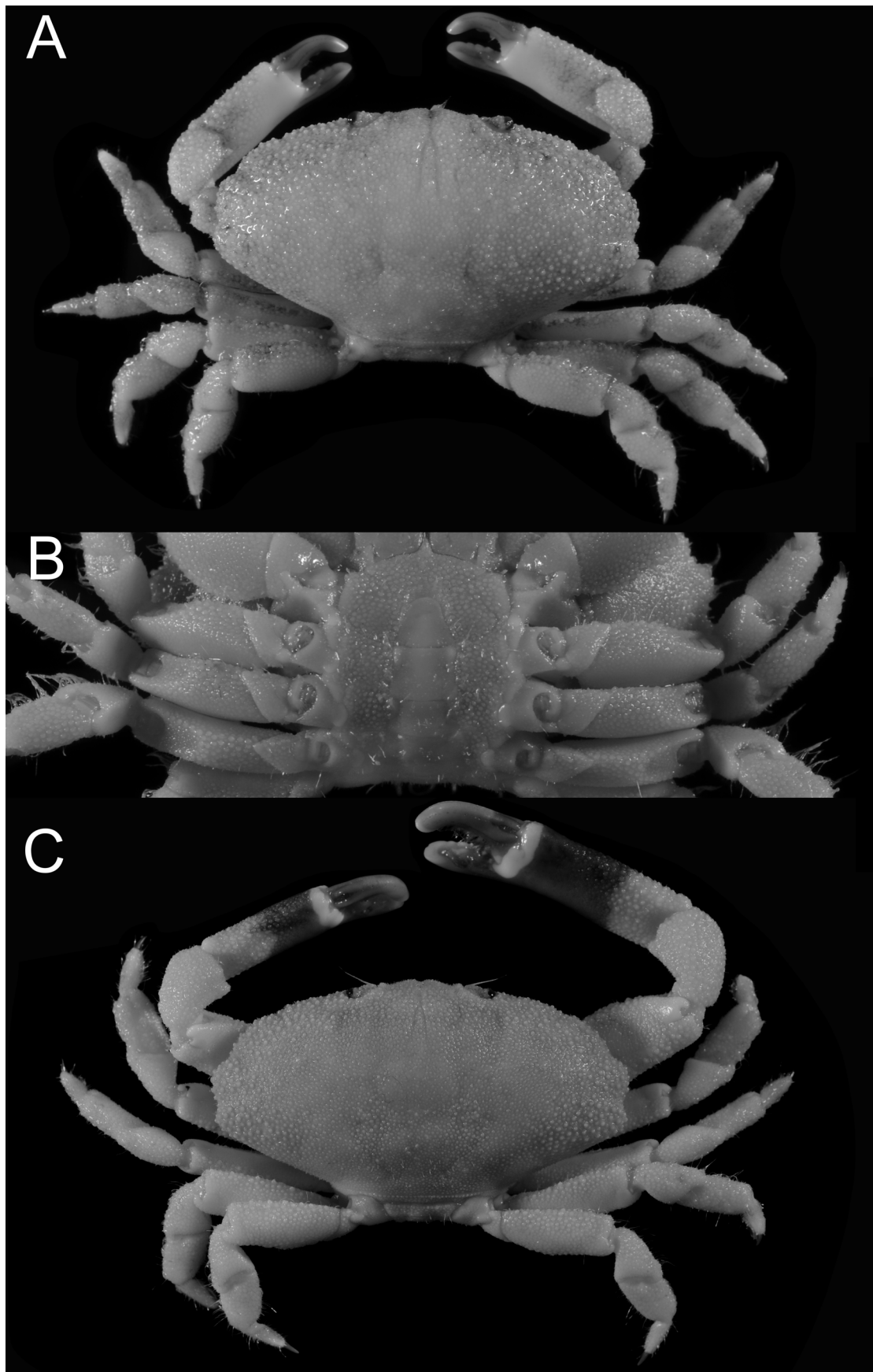
**Remarks.** Forest & Guinot (1961: 80) clarified the identity of *Neoliomera pubescens* (H. Milne Edwards, 1834) and noted that the species is known for certain only from Mauritius, the type locality (see also Serène 1984: 71). Henri Milne Edwards (1834: 384–385) described *Zozymus pubescens* from Mauritius, and provided measurements (but no figure) of one specimen (sex not stated) although he did not say if he had more material. Alphonse Milne-Edwards (1865: 223, pl. 12 fig. 6) redescribed and figured the species (as a *Liomera* species) (see Fig. 6A, B), presumably based on the same specimen but the sex was again not stated. In describing *N. demani*, Forest & Guinot (1961: 80) noted that they examined the male type of *N. pubescens*. In their captions for the figures of the G1 (Forest & Guinot 1961: 83) and carapace (Forest & Guinot 1961: pl. 3), they stated that the specimen was a holotype male. This is not strictly correct. Because H. Milne Edwards (1834) did not designate a holotype and did not clearly state how many specimens he had, all his material should be treated as syntypes. The only extant male that Forest & Guinot (1961) studied should now be treated as the lectotype of *Zozymus pubescens* H. Milne Edwards, 1834. *Neoliomera pubescens* s. str. has also been listed and discussed by Michel (1964: 28), Guinot (1967: 267), Serène (1968: 73), Serène (1984: 71, text-fig. 30, pl. 8A) and Ng *et al.* (2008: 201).



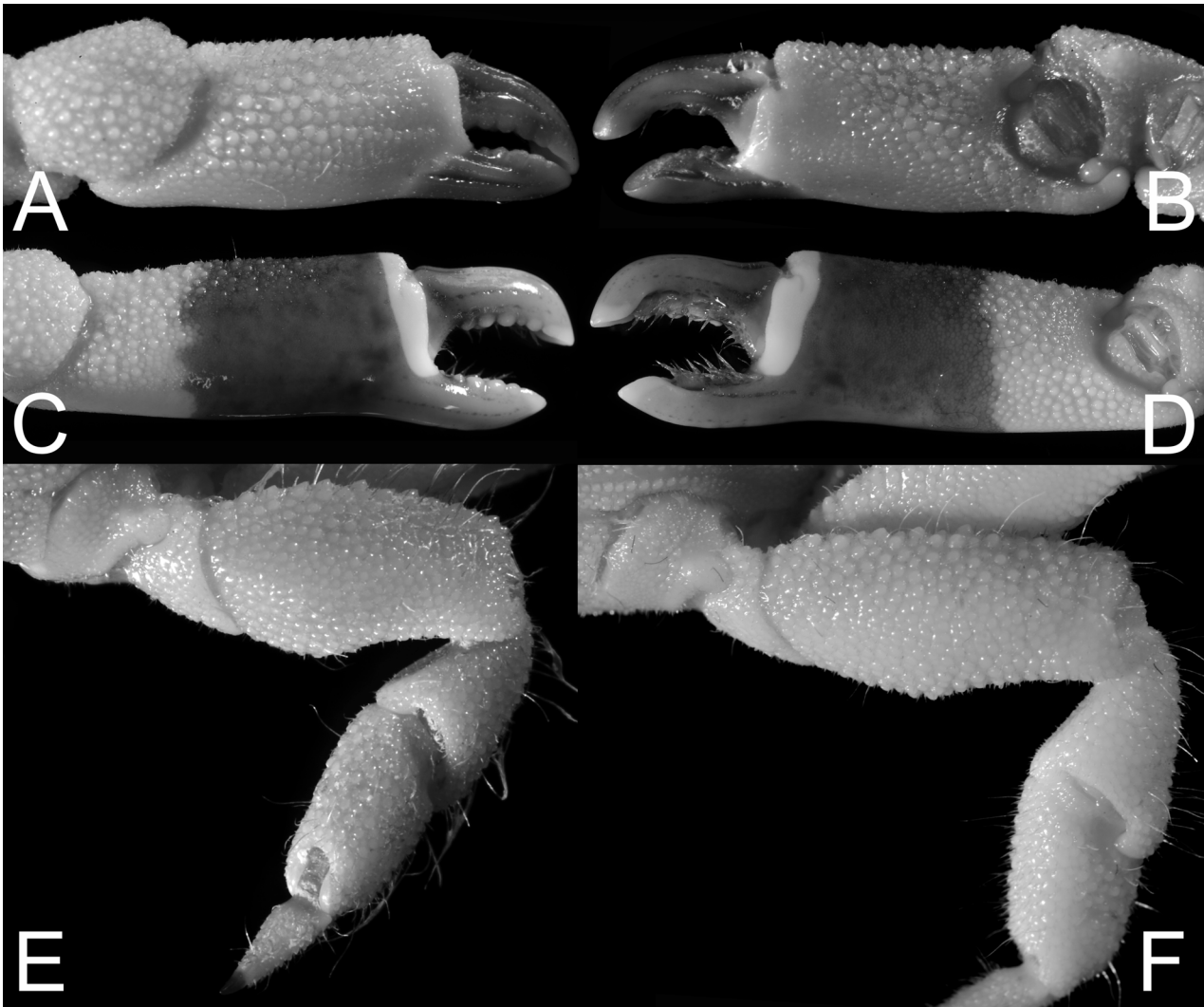
**FIGURE 1.** Colours in life. A–C, *Neoliomera fragraea* n. sp., female (25.3 × 14.3 mm) (NTOU), Taiwan; D, *Neoliomera fragraea* n. sp., holotype male (18.3 × 10.1 mm) (ZRC 2014.0206), Guam [photograph by G. Paulay]; E, *Neoliomera fragraea* n. sp., paratype male (18.2 × 10.8 mm) (NTOU) [photograph by G. Paulay]; F, *Neoliomera demani* Forest & Guinot, 1961, male (35.7 × 18.7 mm) (NTOU), Taiwan [photograph by Wang Kuei-Ching].



**FIGURE 2.** *Neoliomera fragraea* n. sp., holotype male (18.3 × 10.1 mm) (ZRC 2014.0206), Guam. A, dorsal view; B, dorsal view of carapace; C, frontal view of carapace.



**FIGURE 3.** A, *Neoliomera fragraea* n. sp., paratype female (11.9 × 7.5 mm) (ZRC 2014.0207), Guam; B, *Neoliomera fragraea* n. sp., paratype male (18.2 × 10.8 mm) (NTOU), Guam; C, *Neoliomera demani* Forest & Guinot, 1961, male (35.7 × 18.7 mm) (NTOU), Taiwan. A, C, dorsal overall views; B, anterior thoracic sternum and abdomen.



**FIGURE 4.** A, B, E, *Neoliomera fragraea* **n. sp.**, holotype male (18.3 × 10.1 mm) (ZRC 2014.0206), Guam; C, D, F, *Neoliomera demani* Forest & Guinot, 1961, male (35.7 × 18.7 mm) (NTOU), Taiwan. A, C, outer views of right chelae; B, D, inner views of right chelae; E, F, right fourth ambulatory leg.

Forest & Guinot (1961) suggested that *N. intermedia* Odhner, 1925, described from the Philippines, is a junior synonym of *N. pubescens*, and included records of this species from the Philippines and Japan as *N. pubescens*. Guinot (1969: 232, fig. 14), however, examined the type, figured the G1 and noted it was a separate species. *Neoliomera intermedia* is very distinct from *N. pubescens* in the form of the carapace (relatively less wide) and the G1 is more elongated, with a differently structured distal part and setation pattern (Guinot 1969: fig. 14). The live colours of *N. intermedia*, as figured by Sakai (1976: pl. 142 fig. 3) are also quite different, being a uniform orange on the dorsal surfaces, without any white spots like in *N. pubescens* (see also Odhner 1925: 29, pl. 2 fig. 8).

Many early records of *N. pubescens* have since been referred to *N. demani* Forest & Guinot, 1961 (see discussion below). We have on hand a series of specimens from Taiwan and Guam that superficially resemble *N. pubescens* but can be separated by the form of the frontal and anterolateral margins, chelea and fingers, merus of the ambulatory legs and structure of the G1s (Table 1). As such, they are here referred to a new species, *N. fragraea* **n. sp.** The records of “*N. pubescens*” from the Hawaiian Islands by Rathbun (1906: 844), Edmondson (1946: 292, fig. 178b), Edmondson (1962: 252, fig. 9d) and Sakai (1976: 399, part) are probably *N. fragraea* **n. sp.** (see discussion for *N. fragraea* **n. sp.**), although it is possible their material may be mixed because *N. demani* is also known from the Hawaiian Islands. Castro (2011: 99) had already commented that these Hawaiian records of *N. pubescens* should be referred to a new species. The relatively large Hawaiian female specimen on hand (ZRC 2000.0483) (Fig. 5) agrees with the Guam and Taiwan material, including the colour when alive, carapace structure and leg proportions, and we conclude it is conspecific with *N. fragraea* **n. sp.**

**TABLE 1.** Differences between *Neoliomera pubescens* s. str., *N. demani* and *N. fragraea* n. sp.

	<i>Neoliomera pubescens</i>	<i>Neoliomera demani</i>	<i>Neoliomera fragraea</i>
Anterolateral margin	Almost entire, lateral lobes not discernible, separated only by shallow fissures (Fig. 6A, C)	Anterolateral margin with 3 well defined lobes (Figs. 3C, 6E)	Anterolateral margin with 3 well defined lobes (Fig. 1A, D, E, 2A, B, 3A, 5A)
Frontal margin	Median lobes short, truncate, not projecting anteriorly (Figs. 6A, C)	Median lobes relatively more salient, triangular, projecting anteriorly (Figs. 3C, 6E)	Median lobes relatively salient, triangular, projecting anteriorly (Figs. 1A, D, E, 2, 3A, 5A)
Palm of chela	Length of dactylus greater than width of palm; black pigmentation of finger extends only to distal margins of palm (Fig. 6D)	Length of dactylus subequal to width of palm; black pigmentation of finger extensive, forming band around palm, covering much of distal half of palm (Figs. 4C, D, 6G)	Length of dactylus greater than width of palm; black pigmentation of finger extends only to distal margins of palm (Fig. 4A, B)
Fingers of chela	Gently curved throughout length (Fig. 6D)	Straight along proximal part before strongly curving distally (Figs. 4C, D, 6F, G)	Straight along proximal part before curving distally (Fig. 4A, B)
Merus of last ambulatory leg	Short, broad (Fig. 6A)	Long, broad (Figs. 1F, 3C)	Short, broad (Figs. 1A, D, E, 3A)
G1	Subdistal lobe not extending beyond gently curving tip (Fig. 7A, C)	Subdistal lobe subtruncate, not extending beyond almost straight tip (Fig. 7D)	Subdistal lobe subovate, long, extending beyond almost straight tip (Fig. 7B, E)

The specimen of *N. fragraea* n. sp. from O'ahu, Hawaiian Islands (ZRC 2000.0483) was obtained at night from a reef with strong currents (D. Takaoka, pers. comm.). The second author has also observed several specimens from shallow water in the intertidal in Maui at night, hiding among the eroded limestone formations of dead reefs that are exposed to very strong waves and tidal surges (see habitat notes in Ng 2011). These conditions make their collection difficult.

Two of the specimens, the holotype male (18.3 × 10.1 mm, ZRC 2014.0206) and a paratype male (18.2 × 10.8 mm, NTOU), are most probably infected with a bopyrid in their gill chambers; their branchial regions being distinctly swollen (Figs. 1E, 2C).

### *Neoliomera demani* Forest & Guinot, 1961

(Figs. 1F, 3C, 4C, D, F, 6E–G, 7D)

*Actaeodes pubescens*—Miers 1884: 10 (Mauritius); De Man 1891: 4, pl. 1 fig. 1 (Fiji).

*Liomera pubescens*—Ortmann 1893: 452 (Fiji); Klunzinger 1913: 135 (Red Sea). (not *Zozymus pubescens* H. Milne Edwards, 1834)

*Neoliomera pubescens*—Odhner 1925: 28, pl. 2 fig. 6, 6 a, 7 (Palau, Samoa, Tahiti); Buitendijk 1960: 261 (Fiji); Sakai 1976: 399 (part), pl. 142 fig. 1 (Japan); Peyrot-Clausade 1977a: 27 (Madagascar); Peyrot-Clausade 1977b: 212 (Tahiti); Hoover 2006: 281, colour photograph (O'ahu, Hawaiian Islands).

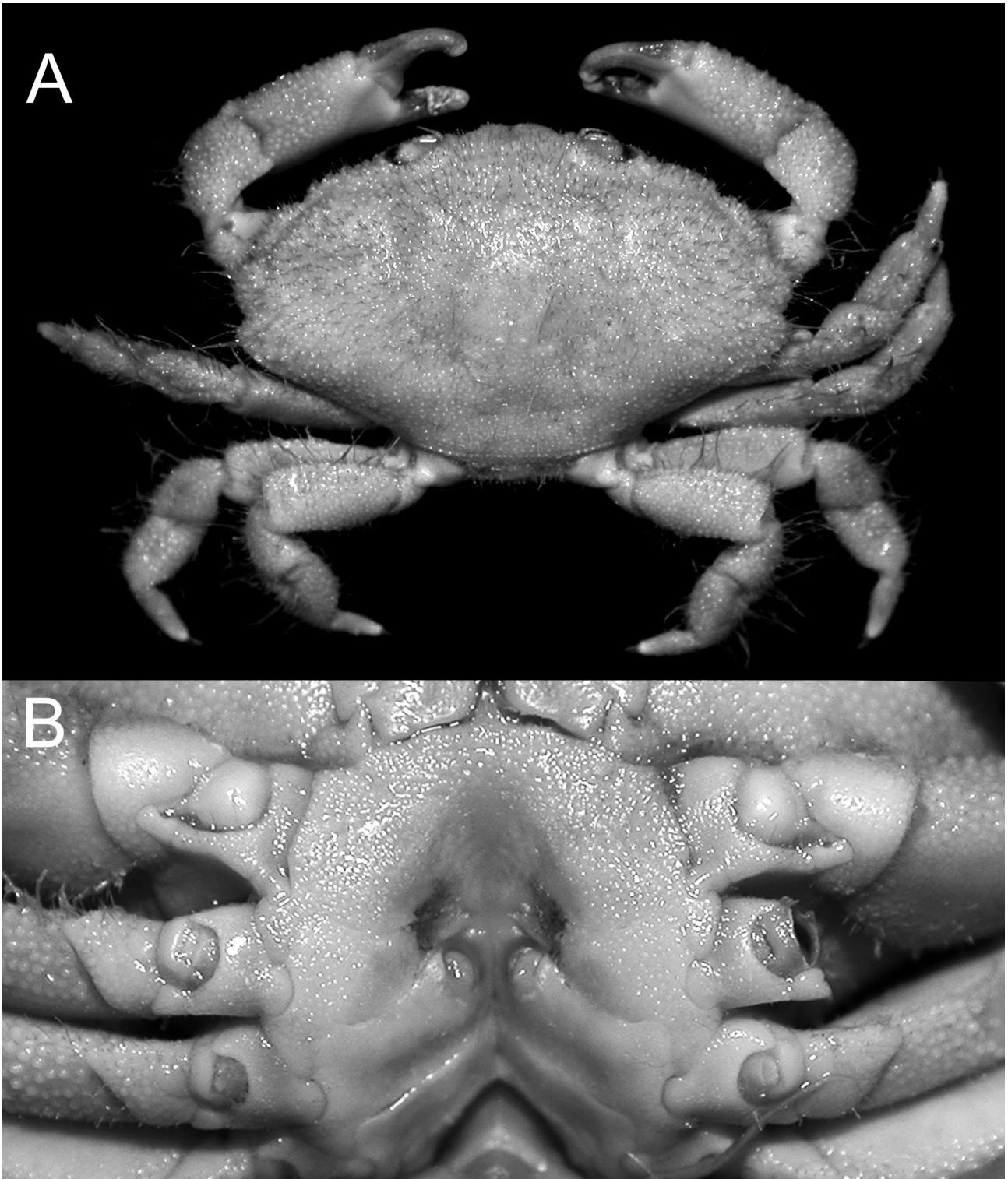
*Neoliomera demani* Forest & Guinot, 1961: 80, text-figs. 76, 77b, pl. 3, figs. 3-5 (Tahiti); Guinot 1967: 267; Serène 1968: 73 (list); Serène 1980: 716, pl. 1 D (list); Serène 1984: 71, text-fig. 31, pl. 8B (Mauritius); Poupin 1996: 40 (French Polynesia); Ng *et al.* 2008: 201 (list).

*Neoliomera demani*—Lai *et al.* 2011: 414 (?Hawaiian Islands).

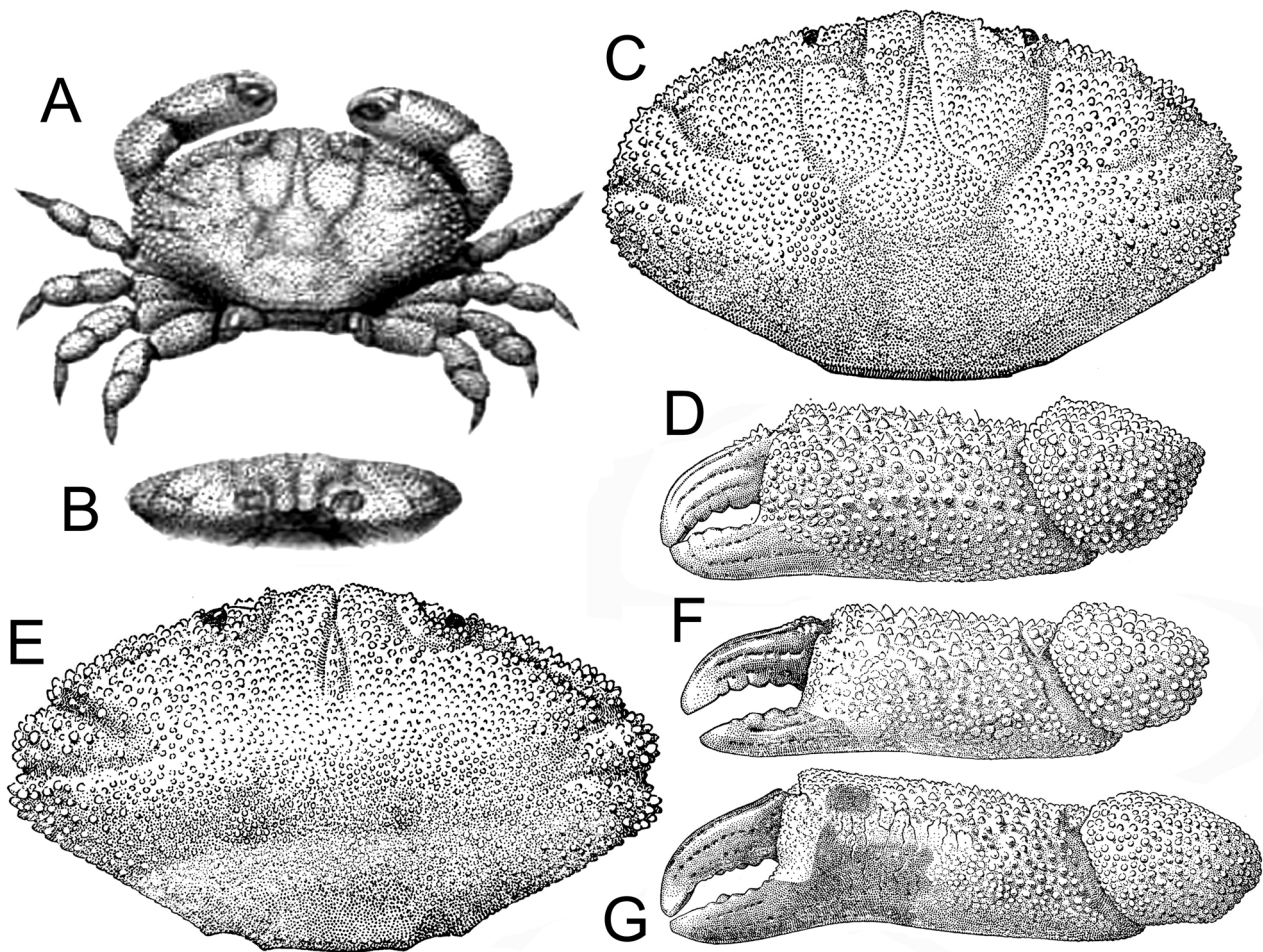
*Liomera demani*—Sakai 1967: 73, 81, frontispiece fig. 2 (Japan).

**Material examined.** 1 male (35.4 × 19.3 mm) (ZRC 2014.0181), Lan-Yu (= Orchid Island), Taitung County, Taiwan, intertidal reefs, coll. S.-M. Chou, 15 March 1998. --- 1 male (35.7 × 18.7 mm) (NTOU 2014.031403), Lan-Yu (= Orchid Island), Taitung County, Taiwan, intertidal reefs, coll. K.-C. Wang, 10 March 2010. --- 1 male (27.7 × 16.6 mm) (ZRC 2009.1174), from aquarium, supposedly from the Hawaiian Islands, obtained S. H. Tan, 18 March 2009.





**FIGURE 5.** *Neoliomera fragraea* n. sp., female (23.9 × 15.0 mm) (ZRC 2000.0483), Hawai'i. A, dorsal view; B, thoracic sternum showing vulvae.

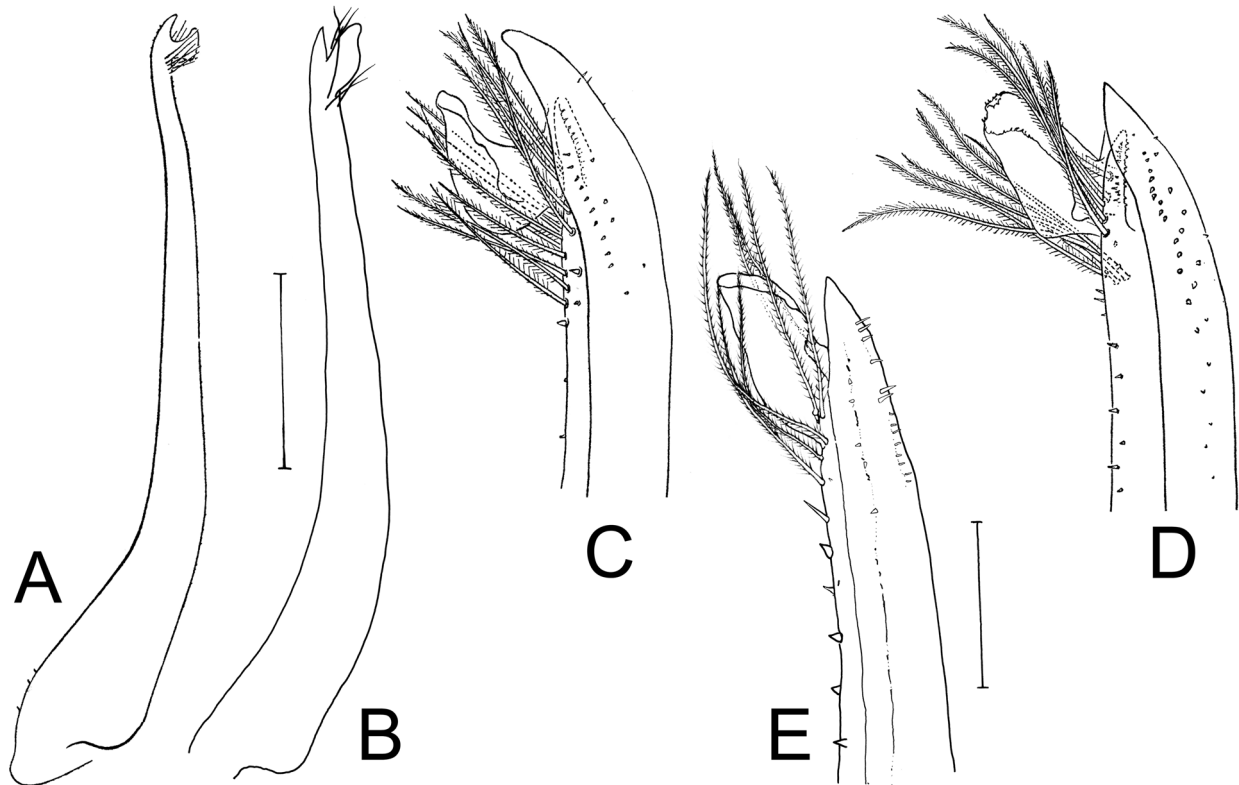


**FIGURE 6.** A–D, *Neoliomera pubescens* (H. Milne Edwards, 1834), dried lectotype male (30.5 × 17.5 mm) (MNHN-B10037), Mauritius; E, F, *Neoliomera demani* Forest & Guinot, 1961, paratype male (23.0 × 13.0 mm) (MNHN-B10035), Tahiti; G, *Neoliomera demani* Forest & Guinot, 1961, holotype male (38.0 × 21.0 mm) (MNHN), Hikueru, French Polynesia. A, B, after A. Milne-Edwards (1865: pl. 12 fig. 6); C, D, after Forest & Guinot (1961: pl. 3 figs. 1, 2); E–G, after Forest & Guinot (1961: pl. 3 figs. 3–5).

**Remarks.** This species was described at length and figured on the basis of two male specimens collected from Tahiti in French Polynesia and Hakuera in the Tuamotu Archipelago (Forest & Guinot 1961), and there is no need to re-diagnose the taxon here. Forest & Guinot (1961) noted that specimens identified as *Actaeodes pubescens*, *Liomera pubescens* and *Neoliomera pubescens* by Miers (1884) from Mauritius, De Man (1891) from Fiji, Odhner (1925) from Palau, Samoa and Tahiti belonged instead to *N. demani*.

The identity of Sakai's (1967, 1976) "*Neoliomera pubescens*" requires discussion. Sakai (1967: 73, 81, colour frontispiece fig. 2) first reported the species as *N. demani* on the basis of specimens from Yoron Island, Japan. Sakai (1976: pl. 142 fig. 1) changed his mind and referred all his Japanese specimens as well as Hawaiian material he had on hand to *N. pubescens*. He commented that "In the full-grown male, the distal portion of the palm is encircled with deep black pigment extended from the fixed finger, however, in the female as well as the younger male, the pigment is only restricted to both fingers." (Sakai 1976: 399). Forest & Guinot (1961: 81), however, had already noted that smaller specimens of *N. demani* tend to have a less extensive black pigmentation on the palm (Fig. 6F). The chela of the Japanese specimen as figured by Sakai (1967: colour frontispiece fig. 2; 1976: pl. 142 fig. 1) clearly belongs to *N. demani*; not only is the black pigmentation being more extensive than in any known specimens of *N. pubescens* or *N. fragraea* n. sp., but also the fingers being longer, straighter and the distal part more strongly curved (cf. Figs. 4C, D, 6F, G). At least on the basis of the Sakai's figures, the last ambulatory merus appears to be relatively longer (see Fig. 4F) as in *N. demani*. The identity of Sakai's (1976) material from Hawai'i is less certain, although on the basis of the figures in Edmondson (1946: fig. 178b; 1962: fig. 9d) (notably in the

form of the chela and ambulatory legs), they agree better with *N. fragraea* n. sp. It therefore seems likely that Sakai's (1976) material contained two species. Hoover's (2006: colour photograph) of "*N. pubescens*" from Hawai'i is almost certainly *N. demani* as his figure shows the characteristic black markings on the chela. We also have one large male specimen of *N. demani* from the aquarium trade (ZRC 2009.1174) that was supposedly collected from Hawai'i. In any case, the presence of this species there is not surprising considering its wide range in the Pacific.



**FIGURE 7.** A, C, *Neoliomera pubescens* (H. Milne Edwards, 1873), lectotype male (30.5 × 17.5 mm) (MNHN), Mauritius; D, *Neoliomera demani* Forest & Guinot, 1961, paratype male (23.0 × 13.0 mm) (MNHN), Tahiti; B, E, *Neoliomera fragraea* n. sp., holotype male (18.3 × 10.1 mm) (ZRC 2014.0206), Guam. A, B, left G1; C–E, distal parts of left G1s. A, C, after Forest & Guinot (1961: fig. 75); D, after Forest & Guinot (1961: fig. 76).

### Acknowledgements

The authors are grateful to Dr. Gustav Paulay (University of Florida) for the valuable specimens and photographs from Guam, the late Mr. Darrell Takaoka (Honolulu, Hawai'i) for passing us his specimen of *N. fragraea*, Miss Shih Yi-Jia (NTOU) and Dr. Chao Shyh-Min (National Museum of Natural Science) for their material from Taiwan, and Mr. Wang Kuei-Ching for the specimen and photograph of *N. demani*. We are grateful to Dr. Danièle Guinot (MNHN) and Dr. Peter Castro (California State Polytechnic University, Pomona) for their helpful comments and suggestions. The study was partially supported by Kenting National Park Headquarters through research grant No.486-98-01 to the first author.

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